

Application No.: 10/578,626
Amendment under 37 CFR 1.116
Reply to Office Action dated May 12, 2009
August 10, 2009

REMARKS

By this amendment, claim 1 has been amended and new claims 25-26 have been added in the application. Currently, claims 1, 5-6 and 24-26 are pending in the application.

The indication that claim 24 is allowed is noted with appreciation.

Claims 1 and 6 were rejected under 35 USC 102(b) as being anticipated by or, in the alternative, under 35 USC 103(a) as obvious over Eilerman (U.S. Patent No. 3,261,736). Also, claim 1 was rejected under 35 USC 102(b) as being anticipated by or in the alternative, under 35 USC 103(a) as obvious over European Patent Application Publication No. 072,493. Further, claim 5 was rejected under 35 USC 103(a) as being obvious over Eilerman.

These rejections are respectfully traversed in view of the amendments to the claims and the remarks below.

The present invention relates to an aqueous solution of a chromium salt and a method for producing the same (see page 1, paragraph [0001] of the specification).

The aqueous solution of the chromium salt of the present invention is characterized in that the level of total organic carbon (hereinafter referred to as "TOC") is low. As a result, it has been found that if the TOC level is low in addition to the low

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level of oxalic acid, when the aqueous solution of the chromium salt of the present invention is used as a surface treatment agent for metal, a product with a more highly glossy finish can be obtained (see paragraph [0013] of the specification).

The term "TOC" refers to the total amount of C, remaining as organic substances in the solution. The total organic carbon (TOC) of a chromium (III) salt aqueous solution implies chromium (VI) which is reduced to chromium (III) by an organic reducing agent. In the aqueous solution of the chromium salt of the present invention, the TOC level is low preferably at 4% by weight or less relative to chromium.

The lower limit of the TOC level in the aqueous solution of the chromium salt of the present invention is not particularly limited. If the production method described below is used, extremely low levels can be achieved, for example, 0.5% by weight in the case of chromium chloride, 0.5% by weight in the case of chromium phosphate, and 0.1% by weight in the case of chromium nitrate (see paragraph [0014] of the specification).

When the chromium salt of the present invention is a chromium chloride, an aqueous solution of chromium chloride includes a compound represented by the composition formula: $\text{Cr}(\text{OH})_x\text{Cl}_y$ (wherein $0 \leq x \leq 2$, $1 \leq y \leq 3$, and $x + y = 3$) (see page 7, paragraph [0018] of the specification).

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A preferred method for producing an aqueous solution of chromium chloride, as an example of the aqueous solution of the chromium salt of the present invention, will be described. The production method includes adding an organic reducing agent to an aqueous solution of chromic acid to reduce part of the chromic acid in advance in the first stage of reaction, and then mixing hydrochloric acid and the organic reducing agent and adding the mixture to the reaction solution to complete the reaction (see page 14, paragraph [0034] of the specification).

In the first stage of reaction, the organic reducing agent is added to the aqueous solution of chromic acid to reduce part of the chromic acid in advance, and then hydrochloric acid and the organic reducing agent are mixed and added to the aqueous solution of chromic acid (see page 17, paragraph [0040] of the specification).

By this amendment, independent claim 1 has been amended to recite "a total organic carbon content in the aqueous solution of the chromium salt is 0.5 to 4% by weight". This feature is disclosed on page 6, paragraph [0014] of the specification. This feature is not shown or suggested by Eilerman and European Patent Application Publication No. 072,493.

Eilerman relates to a glass fiber treatment and it has a particular relation to a size for treating glass fibers which are

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to be woven into cloth and used as a reinforcement for resins (see col. 1, lines 9-12).

Eilerman discloses that the final solution of $\text{Cr}(\text{OH})\text{Cl}_2$ contains 8.21 percent Cr (see col. 4, lines 43-44).

Eilerman does not disclose that a total organic carbon content in the aqueous solution of the chromium salt is 0.5 to 4% by weight as claimed in independent claim 1.

The Examiner stated that it was their position that no oxalic acid was present as the examples of the cited references do not positively recite the use of an organic reducing agent.

Applicants respectfully submit that Eilerman does not specifically recite the use of an organic reducing agent.

For these reasons, it is believed that Eilerman does not show or suggest the present claimed features of the present invention. Applicants also submit that European Patent Application Publication No. 072,493 (EP '493) does not make up for the deficiencies in Eilerman.

EP '493 relates to a tanning salt containing chromium (III), and a method for its manufacture.

EP '493 discloses a tanning salt for the tanning of leather, containing trivalent chromium as well as calcium chloride, having chromium in the form of $\text{Cr}(\text{OH})\text{Cl}_2$ (see abstract).

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EP '493 does not disclose that a total organic carbon content in the aqueous solution of the chromium salt is 0.5 to 4% by weight as claimed in independent claim 1.

Also, applicants respectfully submit that EP '493 does not specifically recite the use of an organic reducing agent.

It is therefore respectfully submitted that Eilerman and EP '493, individually or in combination, do not teach, disclose or suggest the presently claimed invention and it would not have been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious.

New dependent method claim 25, which directly depends on allowed independent claim 24, has been added to recite subject matter similar to claim 5 in method format. Specifically, new dependent method claim 25 recites "said step of adding the mixture to the aqueous solution of chromic acid so as to complete the reaction includes obtaining the aqueous solution having a specific gravity at 20°C which is 1.35 to 1.44, and a molar ratio (Cl/Cr) of chlorine to chromium which is 1 or more and less than 3".

Also, new dependent method claim 26, which directly depends on allowed independent claim 24, has been added to recite similar subject matter to claim 6 in method format. Specifically, new dependent method claim 26 recites "said step of adding the

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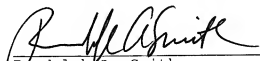
mixture to the aqueous solution of chromic acid so as to complete the reaction includes obtaining the aqueous solution having a concentration in terms of Cr which is 8.2% to 14% by weight". Applicants respectfully submit that these features claimed in new claims 25 and 26 also define over Eilerman, EP '493 and the other prior art of record. Allowance of these claims is also respectfully requested.

In view of the foregoing claim amendments and remarks, it is respectfully submitted that the application is now in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding the amendments or these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,

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Randolph A. Smith
Reg. No. 32,548

SMITH PATENT OFFICE
1901 Pennsylvania Ave., N.W.,
Suite 901
Washington, DC 20006-3433
Telephone: 202/530-5900
Facsimile: 202/530-5902
Kotaki081009